What is claimed is:

1. A clamp apparatus for gripping a workpiece by a rotatable clamp arm, comprising:

a main body;

a rotary driving section which has a rotary driving source that is rotated in accordance with an electric signal;

a pump mechanism which includes a pressure oil-sucking/discharging mechanism that sucks/discharges pressure oil by a rotary driving force of said rotary driving source;

a cylinder mechanism provided with a piston, said piston being displaceable in an axial direction when pressed by said pressure oil fed from said pump mechanism;

a retaining mechanism which retains said pressure oil; and

a toggle link mechanism which converts rectilinear motion of said piston driven by said cylinder mechanism into a rotary motion of said clamp arm,

said rotary driving section, said pump mechanism, said cylinder mechanism, and said retaining mechanism being integrally assembled to said main body.

2. The clamp apparatus according to claim 1, wherein said pump mechanism includes a rotary shaft which is connected to a drive shaft of said rotary driving source, a cylinder block which is fitted to an intermediate portion of

said rotary shaft and which is rotatable together with said rotary shaft, and a plurality of pump pistons which are slidable along holes of said cylinder block.

3. The clamp apparatus according to claim 2, wherein said pump mechanism includes a tiltable member which is formed with a through-hole for surrounding an outer circumferential surface of said rotary shaft in a non-contact state, and a spring member which presses a part of said tiltable member toward said cylinder block, so that amounts of suction and discharge of said pressure oil are adjustable.

4. The clamp apparatus according to claim 1, wherein said main body is provided with a first fluid passage which has one end communicated with a first port of said pump mechanism and the other end communicated with a first cylinder chamber of said cylinder mechanism, and a second fluid passage which has one end communicated with a second port of said pump mechanism and the other end communicated with a second cylinder chamber of said cylinder mechanism.

5. The clamp apparatus according to claim 4, wherein a bypass passage is communicated with said first fluid passage and said second fluid passage, a shuttle valve is arranged in said bypass passage, and said shuttle valve is displaceable depending on a pressure difference between said

pressure oil flowing through said first fluid passage and said pressure oil flowing through said second fluid passage.

6. The clamp apparatus according to claim 1, wherein said retaining mechanism comprises an accumulator.

7. The clamp apparatus according to claim 6, wherein said accumulator includes an accumulator piston which is provided displaceably along a hole formed in said main body, and a spring which urges said accumulator piston.

8. The clamp apparatus according to claim 1, further comprising an internal DC power source which is integrally assembled to said main body, wherein said internal DC power source comprises a fuel cell.

9. The clamp apparatus according to claim 8, wherein an interface unit is integrally assembled to said main body for feeding a control signal to said rotary driving source.